v. 10 #9

The MONTHLY REVIEW

Published Monthly by the
American Electro-Platers Society

A SOCIETY FOR THE ADVANCEMENT
OF THE
SCIENCE OF ELECTRO-PLATING

SEPTEMBER, 1923

Entered as second-class matter, September 26, 1922, at the Post Office at Oneida, N. Y., under the Act of August 24, 1912.

Acceptance for mailing at special rate of postage, provided for in section 1103, Act of October 3, 1917, authorized September 26, 1922.

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The fine points that are uncovered in our work as a result of close study, deligent care, constant application and always trying to improve our methods, represent the best and most valuable knowledge we get in business—and the sum total of that attentive attitude is what we call SKILL.

Those who skim over the surface in a hit-or-miss fashion not only forfeit the best returns on their efforts but are ever barred from the keen pleasure of seeing beauty in the results of their labor.

If you would make good you must understand that the work which counts is the work in hand—it's the things you've done that show what you can, not the bigger and better things you plan. The work you do NOW must be done right if you reach your goal or your utmost height—so keep your step, doing your part each day with pep—for it's not what you do but how you do it that counts in making good.

MONTHLY REVIEW

Published by the

American Electro-Platers' Society

ONEIDA, NEW YORK

Editor's Office, 166 Willow Place, Sherrill, New York

VOL. X SEPTEMBER, 1923 No. 9

EDITORIAL

FROM THE EXECUTIVE BOARD

The new Supreme Officers for 1923-1924 take this opportunity to extend to you their greetings, and to ask your earnest and unbiased aid and co-operation in an endeavor to make this a banner year in the history of the A. E. S. for new members, and more education and loyalty to our society.

In the past years some of the branches have deviated from the by-laws and Constitution precepts, and in many instances this has caused annoyances to our society; this we wish you officers and members to kindly assist us in overcoming by strict and conscientious obedience to the by-laws and Constitution as written and accepted by us to guide our destiny until experience has caused us to make changes in these laws in a legal way. We further urge you to attend your branch meetings regularly so that we may by closer personal contact promote the feeling of confidence and loyalty to each other, so that at our next annual meeting in Milwaukee, we of the Supreme Body may say to you members "You have stood by us loyally and we have served you well, and let peace and harmony prevail to our success."

We also feel that during the ensuing year we will see many new and interesting plating problems investigated through the Bureau of Standards at Washington, D. C., that will make us feel proud that we are able to send a research committee to the bureau to confere with Dr. Blum and his assistants and to give them suggestions that they may be able to get us more information so necessary to our boys in this era of commercialism.

We further assure you that with your loyalty to these requests that you may expect a genuine A. E. S. year and an administration that will make you proud of having been a contributor to, and it will be a lot of pleasure to your past officers who have labored so hard and conscieutiously to bring this society to its present high plane of efficiency.

Thanking you all in advance for your every assistance in complying with the aforesaid, we are

Very truly yours,

J. E. STERLING, Supreme Pres.
E. J. MUSICK, 1st Vice-Pres.
ELMER WOODMANSEE, 2nd Vice-Pres.
F. J. HANLON, Sec'y-Treas.
F. C. MESLE, Editor.
W. J. ALLEN, Past Pres.

APPEAL FOR HELP IN A BATTLE AGAINST NICKEL ITCH

Any one who has suffered from the effects of this painful disease or has witnessed the suffering of shopmate or employee will respond to this appeal.

If every member of the A. E. S. will constitute himself a committee of one to put the program of the Boston Branch over the top, you may be assured that some future number of this paper will carry a ray of sunshine to every member of the craft.

To the writer's knowledge many cases of nickel itch have been reported in New England in the past few years. Some cases were so bad that they would not respond to the treatment given, baffling the physicians who have practically given up the cases, letting nature take its course.

The writer has given the subject much time and study and has been surprised to find that physicians generally are not acquainted with this trouble. Even those who have made a specialty of skin diseases are unable to assign the cause or suggest a permaennt cure or preventative.

The Boston Branch has appointed a committee, consisting of Mr. Herrick of the S. H. Chemical Co., Mr. Gale of Gillette Safety Razor Co., and Mr. Williams of the Waltham Watch Co. to thoroughly investigate this dread complaint and if possible develop three things:

First—The best treatment.

Second—A cure.

Third—A preventative.

The results of the work of this committee is to be published in the A. E. S. REVIEW, for the benefit of all.

The committee realize that this is a big order and that the best results cannot be obtained without the assistance of every man in the business who has any information to offer, hence this earnest appeal.

At the last meeting of the Boston Branch the writer reported the progress made by the committee.

At the present time there are six cases under treatment in the city of Boston, and the committee have been particularly fortunate in enlisting the interest and active co-operation of Prof. Cheever of the Massachusetts General Hospital, who is one of our best-known dermatologists. This gives us an exceptionally well-trained medical mind and every hospital equipment that could be desired in such a campaign.

In every case which we have investigated it has been necessary to take the victim out of the plating room to give proper treatment or effect a cure.

The writer has obtained much valuable information from large manufacturing plants where cases have developed and treatments applied to allay the soreness and irritation.

Believing that much valuable information can be obtained in plating shops throughout the country, I make an earnest and urgent appeal for any and all information that any plater may have to send to me at the earliest convenient moment, particularly answer to the following questions:

Question No. 1—Do you know of a case of itch or rash among men working over a sulphuric or hydrochloric acid pickle?

If you know of such a case give a careful description of it, and just how it compares with nickel itch.

Question No. 2—Do you know of a case of itch or rash resembling nickel itch, contracted by a man working in or around a plating room, but not over the nickel baths? If you know of such a case, please send me full information.

Question No. 3—What type of men in your experience contract nickel itch?

Question No. 4—What treatments for nickel itch do you know of? This question is a very important one, and am sure **many** can give valuable assistance.

It is seldom that such favorable circumstances will surround such an effort as this, with the practical knowledge of the plater and the scientific knowledge of an expert in skin troubles, the latter so deeply interested that he is giving his time and ability to the cause, some real progress should be made. Material progress will be made if every foreman plater, every journeyman plater who reads or hears of this article will forward every bit of information they may have or may obtain to S. Herrick, Chairman of Committee of the Boston Branch, 6 Beacon Street, Boston, Mass., care S. H. Chemical Co.

We suggest that if you are in a large plant maintaining a hospital department or first aid attendant that you see the doctor, nurse or attendant at once, gather all the information possible and forward to us. Give us the name or names of any doctor who, to your knowledge, has treated one of these cases. Show them this article and have them give you a copy of all their prescriptions. Have them write the prescriptions for you. Do not attempt to write them yourself. You may make a mistake that will mislead us.

The solving of this troublesome problem is dependent upon YOU. Respond to your part, and in some future number of the REVIEW, when we publish the result of our investigations, if we succeed, you may feel that you did your part.

S. HERRICK,
Chairman of Committee.

ROCHELLE SALTS IN A BRASS SOLUTION

Read by E. Coles, Toronto Branch

The subject of this paper, Rochelle Salts in a Brass Solution, is one on which I can give you no Technical Information, it is strictly the observations, results, and conclusions of the use of Rochelle Salt, of which I will write.

The firm conviction that the major cause of all trouble, with a Brass Solution on production workor where it must be operated constantly and a uniform color obtained, is slow

anode corrosion, lead me to look for something that would facilitate corrosion.

The solvents, Cyanide and Sodium Hydroxide used by many Brass Platers, are without doubt useful, but after a certain point, they become a deterent rather than an aid to depositon. It was something futher than these that I looked for. Something that would not affect the color of the deposit, that would have action mainly on the oxides formed at the anode, and whose solvent action would be if possible, about equal with copper as with zinc.

I remembered a good many years back, reading of Rochelle Salt, being used in a Brass Solution, it was an old book and the author's name, I cannot recall. It struck me however as a possible means to my desire. In an article some years back, 1915, I believe, Dr. Oliver Watts, on cleaning and plating in one solution, recommended the use of Rochelle Salts, recommending the use of 8-10 ozs. per gal. and stated that at boiling point in copper clean and plate, it gave an anode efficiency of 100.5%, also if I remember right, he recommended or stated that it would improve the efficiency of a Brass Cleaning and Plating Solution. With this in mind and also that Rochelle Salt had been used in Coppering by Contact, and that it was a Solvent for zinc oxide, I decided to try its use on a regular Brass Solution, operated at room temperature.

A few experiments with small bodies of Solution seeming satisfactory to me. I added to a 300 gal. solution 1½ ozs. to the gal., after operation for a while, I saw my ampere reading remained constant, instead of as usually falling. I increased the cathode by adding more work and up went the ammeter and it stayed up. I kept this up till I had increased the amount of work being plated 100%. My load of work was just twice what it was before, and my anode reading from 150 up to 450 amperes. I therefore decreased the time of plating, where work was run 15-20 minutes I now run it 8-10 minutes, so far for production. I do not claim that Rochelle Salt improves the color of the deposit, that of course is dependent on the composition of the Brass. My only claim or conclusion is that the action is of tartaric acid on the film on the anode. I do not say that it attacks or corrodes the anode itself, tartaric acid being a very weak

acid, my contention is that it acts with the copper and zinc oxides to form tartrates which are readily soluble in both cyanide and caustic soda, it seems I might say, to act as an intermediary, which give up the metal to the free cyanide. It is like the man in the middle, handing up the bricks from the laborer to the bricklayer, or how ever you like to put it.

Until I can be shown otherwise, I am satisfied that it is of great benefit to the Brass Plater, who must operate continually. It has enabled me to operate my solution constantly from 9 to 12 hours per day with out any perceptible change in color. Instead of being constantly watching the tank and having a stock or concentrated solution as advocated by the majority who speak on the subject. I leave it to the operator and he is seldom in trouble.

While I was principally looking for help in handling steel chain, I have also found it of great benefit in handling antimonial lead work in the same solution. I attribute this greatly to the fact that the free cyanide content is low in comparison to what would otherwise be necessary and while blisters were no surprise, under the old system, they are very seldom to be found with the use of Rochelle.

I might add also, that using a mechanical plater on Brass, I took the solution when it should have been O. K., but would not seem to plate uniform and added from 1 up to 4 ozs. per gallon and got perfect results from it. The conclusion I drew from this was that it was also a good conductor.

It is a neutral salt and its addition to the solution is not accompanied by any of the unpleasant features accompanied by the additon of such things as Sodium Bi-sulphite. I believe it to be a fairly stable compound, but it does require additions from time to time.

In conclusion to you who are opertaing Brass Solutions, I commend Rochelle Salt. I have great confidence in it, and should this be published in the Review, I trust that it will receive full criticism from those who can delve futher into the subject, as I would greatly like to know the "Why."

ELECTRO DEPOSITION OF THE RARER METALS

By Professor Colin G. Fink, Ph. D.

Discussions on paper printed in August Review

PRESIDENT ALLEN: Are there any questions you wish to ask Dr. Fink?

MR. WALTER FRAINE: I would like to ask Dr. Fink to repeat again his remark of what the addition of cadmium cyanide does to silver solution.

DR. FINK: According to The Metallurgical Company of London, the addition of cadmium cyanide to silver cyanide hardens the silver. They claim they can go up as high as twenty-five per cent cadmium. I found no reference to the use of that silver cadmium bath in this country.

MR. J. D. ALLEY: In that same connection, I read a short article some time ago, where a man had worked out a state or condition of silver which did not require polishing more than once in two years. Does the addition of cadmium to silver prevent staining?

DR. FINK: I did not see that article. But the addition of cadmium to silver increases its resistance. Cadmium resists corrosion much more readily than silver.

MR. CHARLES H. PROCTOR: I might state, for the information of those who have never used cadmium and silver, that cadmium is being added constantly in commercial practice to silver solutions. They have been using cadmium-silver solutions for several years and it has been found that the silver is considerably harder than when used in its natural state. Futhermore, we find that cadmium-silver doesn't tarnish as readily as silver alone. It is not so susceptible to sulphurous vapors.

I experimented with it several years ago, plating cadmium and silver, and I still have some of that work at home. It tarnishes very little as compared with regular sterling silver. I believe that eventually we will use a good deal more cadmium is silver solutions than is being used now, but even now, it is being commercially used to some extent.

MR. O. E. SERVIS: I would like to ask if there is any particular advantage of nickel cyanide introduced into the silver bath over cadmium cyanide, from the standpoint of hardness and oxidation. Can you tell us, Mr. Proctor?

DR. FINK: Mr. Chairman, Mr. Proctor brought up this

question of cadmium used in the bath. I was asked a while ago about using it in the bath for table ware. We understand that cadmium is not good for the health. Now if any of that wears off, how is it going to affect the system? Perhaps Mr. Proctor could tell us whether silver-plated table ware, using that cadmium bath, is going to affect the health any.

MR PROCTOR: I don't belive cadmium would affect the health, but so far as I know, cadmium is not being used in silver-plating table ware. It is used in fixture work and similar line, however, where it does not come in contact with foods.

MR. SERVIS: I would like to find out which is preferable—cadmium cyanide introduced into the silver bath, or nickel cyanide?

MR. PROCTOR: There is no question about the hardening advantages of nickel in silver, but unfortunately you can't carry as much nickel in your silver as you can cadmium.

Analysis has shown that about five per cent is the maximum you carry over with your silver.

MR. SERVIS: Isn't it a fact that cadmium cyanide silver-plate is softer than the nickel cyanide silver-plate?

MR PROCTOR: Well, apparently they are very close to each other. Cadmium seems to harden up the silver quite a little. Of course, I have not made any tests.

MR. SERVIS: I wonder if any have conducted an investigation regarding the introduction of cadmium and nickel in silver, and whether one has a preference over the other.

MR. PROCTOR: I would think that cadmium would be preferable.

MR. J. H. FEELEY: I would like to ask whether, if cadmium is added to the silver bath, it would be burnishable? Would it stand the burnish to the extent that silver itself would?

DR. FINK: Even better.

MR. E. W. WOODMANSEE: Is Mr. Sizelove present? I think he can tell us more about cadmium plating than anybody here, perhaps.

MR. O. J. SIZELOVE: In cadmium-plating and silver-

plating, I have found that when cadmium is increased to twenty-five per cent, or over, it has a tendency to throw the color of the silver off. You won't get pure white silver. We have been doing some work that is cloudy, and it would not be good for table ware or for sterling silver.

Cadmium when added to the silver will keep it from tarnishing longer than when there is not the cadmium added. I expect we will do more work along that line in the future and we will have more to say about it.

But it can be added, taken up with cyanide, which is the proper way to add it to the silver, I think.

MR. FEELEY: Would five per cent cadmium resist tarnishing of the silver ware without any injurious effect to continous use on the table?

MR. SIZELOVE: I would hesitate to answer that question because we have not gone far enough.

MR. FEELEY: I am interested in that because I handle silver ware for dining cars and hotels very extensively and I am sure that it is one of the things that I would like to produce, in my section of Canada, if possible. If cadmium-silver has greater wearing and non-tarnishable qualities, I would like to use it—providing it won't kill anybody, of course. The people I serve feed many thousands and I wouldn't want to be the cause of killing anyone.

MR. GEO. GEHLING: It has been said that cadmium is dangerous or injurious to the health of people. The fact that it doesn't tarnish silver means that it is not readily dissolved. So in what manner would it get into the food, so that it could injure people using that silver-ware?

MR. GEHLING: Perhaps Dr. Fink could answer that.

DR. FINK: There are acids in the food which would attack the cadmium, that are not present in the ordinary atmosphere. The atmosphere would not affect the cadmium in the plate but the acids in the food and saliva would affect it. Wherever acetic acid is used, the cadmium is affected.

MR. GEHLING: But it wouldn't corrode it.

MR. FEELEY: It is not corroding we are getting at—it is killing a man.

MR. GEHLING: You have to decompose it before you can assimilate it.

MR. R. J. HAZUCHA: In order to answer Mr. Gehling's question we had better explain the fact that the atmospheric conditions will not tarnish cadmium-silver plate. Sulphur will oxidize the silver, but food acids will dissolve cadmium and that is where the injury to the person would come in. The oxidizing, and the dissolving of the cadmium by the food acids, are two entirely different things.

MR. H. H. SMITH: I can't see how cadmium, or in fact, any other metal deposited with silver, would be poisonous to any person or injurious to their health.

We have experimented with silver alloys, where we have used cadmium to keep the silver from tarnishing, up to about fifteen per cent; and we did away with it for the simple reason that it changed the color. It made the plate a bluish color and did not give us a white sterling silver. But as far as its being injurious to the health is concerned, my opinion is that it is not injurious. I don't see how it can possibly be. It seems to me, if a plated knife or spoon could be injurious, the copper would come off of the plated article.

MR. FEELEY: Would the Doctor explain how much more injurious cadmium would be than an exposed surface of German silver?

DR. FINK: I am afraid you are asking me a physiological question, I would not be able to answer. I think that belongs to another department; I am a metallurgist and not a doctor.

MR. FEELEY: I do know, in my daily experience of handling silverware, that the base metal is 95% of German silver, and very many pieces—hundreds of pieces—are being used daily in the different hotels that have ten, fifteen or twenty-five per cent exposed surface. So if the cadmium were not exposed any more than that, then the cadmium would not be any more injurious to health than exposed German silver, would it

DR. FINK: But cadmium has a distinct physiological effect that is different from German silver. There is nothing in German silver that would be harmful to one's health.

MR. D. W. ROBINSON: Can you give any information as to the cost of chromium—and where can it be obtained?

DR. FINK: The chromium metal is produced by The Thermit Company, 120 Broadway, New York City. The

selling price off hand I don't recall, but it is something like, four, five or six dollars a pound, depending on the quantities you buy. Chromium is a comparatively cheap metal. When bought as ferro-chrome, it is cheaper than buying the chromium metal.

The point to remember is, that chromium metal is a good anode, to use, contrary to all former beliefs. Chromium plating that has been carried out in the past, has usually been done with the use of a platinum anode. When you have to use platinum anodes in your bath, chromium plating becomes very expensive.

MR. ROBINSON: How does the color compare with nickel?

DR. FINK: The color of chromium is silver white. The nickel has a little more of a yellow tinge to it than the chromium. On the other hand, chromium will hold its color indefinitely. Nickel will turn almost black in a laboratory atmosphere and chromium will stay bright indefinitely. It is about the only metal I know of that will stay bright in a laboratory atmosphere. Not even platinum will stay as bright.

MR. E. W. T. FAINT: Will Dr. Fink give us the formula for chromium?

DR. FINK: I think it is 145 grams of chromic acid per leader, and 3 grams of chromic sulphate per leader.

MR. FAINT: Have you any information on current density used and voltage?

DR. FINK: I am just giving you these values from my recollection. The current density is comparatively high. If you will give me your name, I will be glad to give you the full details on that. The voltage is comparatively small.

The whole secret in chromium plating is to use a very high current density. You have got to produce at the cathode a large evolution of hydrogen. Unless you get that hydrogen bubbling at the cathode, you do not get any plating. It is the protective action of the hydrogen that prevents the chromium from going back into solution. So your current density is comparatively high.

MR. R. E. JOHNSON: I would like to ask Dr. Fink whether any experimental work has been done on the resistance of chromium plate on iron, or molten brass?

DR. FINK: We took samples of chromium-plated steel and placed them in brass which was superheated, and these samples were unaffected at all; whereas, samples not so plated, ordinary pieces of iron, would disappear right off. Nickel- plated iron disappeared right off. Ferro-silicon would dissolve in brass, zinc or tin, but chrominum plated steel was the only sample which remained untouched.

MR. NORDMAN (Cincinnati): Getting back to the cadmium and silver proposition, there is one question I would like to ask the Doctor. It has been said that cadmium resists oxidation. If you were using a solution of that kind and were getting out some of these antique silver finishes, the question in my mind is whether your sulphid solution would discolor it sufficiently to get your finish. Or could something else be used?

DR. FINK: You can get an antique finish on any metal except chromium. I have not found a way putting an antique finish on chrominum. But silver and cadmium are easily finished in the antique style.

If you take your cadmium-silver plated work and put it in an enclosed chamber in which you have hydrogen sulphid vapors, it turns back in fifteen hours. There is no trouble in getting the black when you want to. When we talk about resistance to tarnishing and the atmosphere we never refer to high concentrations of hydrogen sulphid such as you would have in an enclosed chamber in which you purposely generate it.

DR. FAINT: How would you introduce iridium into a platinum plating solution?

DR. FINK: I think I mentioned in my talk, that no details on this have as yet been published. As soon as I get hold of these details, I will be glad to hand them over to you.

I am a little suspicious. It might be cyanide, but I don't know. There is a representative of The Baker Company of Newark here. He may be able to tell us a little more.

MR. BRAININ (Newark): My answer is negative. We have experimented for some time, trying to produce a satisfactory platinum iridium alloy plate, and we have been unable to do so. Experiments are still continuing and we are still hoping for success.

MR. W. S. BARROWS: Dr. Fink said that chromium

deposit may be soft or hard. I would like to ask Dr. Fink the method of softening the deposit of chromium.

DR. FINK: Chromium plating can be produced fairly soft, depending on current density and temperature conditions. You can bring your current density as low as you dare. If you go too low, however, the plate disappears entirely. You always have to have an excess of hydrogen present, or you don't get chromium plate—excess either of oxygen or hydrogen. Excess of hydrogen does less damage than excess of oxygen in the chromium plate.

Chromium plating is being carried out in one establishment in chromium plating wire, and that wire is just as exible—the plated wire—as the original core; and there is no sign of peeling of any kind.

Although hydrogen is the one thing that makes nickel brittle, that is not the case with chromium. To improve the qualities of chromium give it more hydrogen.

MR. FRAINE: Mr. President, I feel that Dr. Fink has taken us rather far afield tonight from the usual paths of the electro-plater. He has opened before us a vision of the possibilities of the future, and he has told us of things that are strange to many of us. I believe that every man here is going to take home with him, something that is going to be of great value to him in the future, possibly in the immediate future, from Dr. Fink's talk. I think that we owe Dr. Fink, at this time, a warm vote of thanks for the very able manner in which he has laid before us this vision of the future of electro-deposition in the rarer metals.

MR. FEELEY: In rising to second, the motion for this vote of thanks, I would like to add, that if it were possible to have the paper that the Doctor read, and the notations and remarks made, typewritten, at the expense of any of the members who would like to take it back, it would be a great pleasure to be able to get it. Personally, I would feel that any cost necessary to secure it would be a small detail.

There is a motion before us that a vote of thanks be given Dr. Fink for his very interesting and instructive address.

A rising vote of thanks was given Dr. Fink.

CLEANING OF METALS BEFORE PLATING AND IN PROCESS OF OPERATIONS

By a Member of Connecticutt Valley Branch, Hartford

In cleaning work before plating, we generally start the cleaning operations when the work comes from the machine previous to being polished and buffed; if the parts are brass or copper a good cleaning in potash and then bright-dipped makes it far easier for the polisher to handle and also helps the plater as he starts to clean his work for the plating bath. When the work reaches the finishing room it becomes necessary, first of all, to remove the grease and tallow left from the polishing and buffing wheels. This is done by immersing in "any electric cleaning tank" (material used 3 to 4 oz. per gallon), after a minute or two work is removed and if steel or iron is placed in muriatic acid and placed in cold, running water, struck up in hot cyanide copper, then in cold running water again and placed in plating tank.

If work happens to be brass or copper or aluminum and requires only a plain white finish the above method is followed only instead of using muriatic acid, the work is placed in bright dip, then in cold water, cyanide dip, cold water and ready for plate.

Work coming from hardening room with fire scale or rust on it is pickled in dilute sulphuric acid pickle placed in hot water tank with about 2 lbs. sal soda in the water. This helps neutralize the acid and also puts a slight temperate-resisting film on the material pickled; from here it is taken and dried in clean sawdust.

Material coming from punch press with heavy mineral oil is tumbled in clean sawdust with Baird tumbling barrel (Baird oblique tilting). Sometimes the nature of the work being very heavy it is not expedient to clean in regular solutions; this is where tumbling barrels come in handy. Place a whole stock box in barrel, start the motor, it will empty itself, remove box and in about 10 or 15 minutes work is thoroughly cleaned. This method has also the big advantage of removing burrs, thus doing away in many instances of filing or rough polishing operations.

High-Grade Casted Metal

Work is first polished on No. 200 emery then tripoled

and colored very clean. Work is then wiped clean, racked and put through a weak Kalye solution, stand about 2 B, washed and struck up in a hot brass and thin nickled.

Large Brass Work

Work is taken away from the press with oil all over it. It is then put in an electric cleaner, made up of the following: ½ lb. sal soda, 3 oz. of potash, 2 oz. of cyanide, direct current 6 to 8 volts. It is then ready for the forming presses.

(2) Small work that is to be plated in plating barrels ar cleaned in a tumbling barrel with sawdust for about five minutes. They are then dumped in a plating barrel and plated brass, zinc or nickel. The writer has been following this system for the last seventeen years. Not any of this barrel work sees the potash.

For still tank the work is racked up and goes through the cleaner in the regular way. (Any up-to-date cleaner will answer), then cyanide dip, then washed, then into tank. All large work is brushed with a cotton potash brush.

Aluminum is cleaned as it comes from the press covered with mineral oil, first in whale oil soap and then given a bright dip. Steel work that is to be nickel plated after being polished is first put through the electric cleaner, then into a muriatic acid dip, then washed and placed into the nickel tank.

I use any metal cleaner, 4 ozs. to a gallon, except the electric cleaner, and with that I use 2 ozs. to a gallon. I use reversed current 5 volts and high amperage 8 to 10 minutes in the cleaner, then rinse in cold water, then into 2 per cent. hydrochloric acid, and dip from the cold water into a strong solution of sodium cyanide. I then copper plate the work for several minutes in cyanide copper solution; this work is mostly steel and cast iron. In all my cleaning tanks I have ¼-inch pipe running across the bottom of each tank. This keeps the solution agitated and pre vents its settling at the bottom. Most of our soft metals are hung suspended in the cleaner from 7 to 10 minutes. If the cleaner is right, no more should have to be done to the work, and it is ready to be plated. All of this work is tripoli buffed and colored with crocus.

The sand-buffed work requires more work, but it is done about the same way, except that after it has hung in the cleaner for several minutes, it is rinsed first in cold water, then back to the cleaner, and thus repeated several times.

German Silver

There are many cleaning compounds available at the present time, which give very efficient service. It is up to the plater to select the one that is most suitable for the particular line of work which he had to clean.

We find Kalye compound insures a chemically clean surface on nickel silver flatware in a comparatively short time. This cleaner should stand from 6 to 10 Baum. and from 180 to 200 Fah. The upkeep is very small, depending upon the quantity of work turned out.

The time required to properly clean a batch of 48 dozen spoons is aproximately 10 minutes, rinse in water, dip into cyanide tsanding about 10 Baum., rinse again into water, then into bright acid dip, rinse again and strike in the usual way.

Cleaning operations should never be done hastily. Many rejections, much time and material can be saved by avoiding careless cleaning and rinsing.

BRANCH NEWS

Toronto Branch

Regular meeting held Monday evening, Aug. 27th, with exceptionally good attendance and splendid interest. The "round up" of delinquents, which was started in July, resulted in unpredented cash receipts.

Discussion of business affairs was brisk and to the point. Mr. Chas. Kemish read a paper on "Job Shop Practise," and very fully described his mehtods. He handled the subject like a veteran and withstood a spirited interrogation period with credit to himself. Charles is one of Toronto's wide-awake platers and knows the business.

Librarion O'Keefe read a paper on "Opportunity," in which he very successfully alluded to the Electro-Platers class at the Technical school. Thos. O'Keefe is a real "honest to goodness' booster for the Tech. class and we will strive to help him get a large attendance this year. Messre. W. W. Wells, Sr., and W. W. Wells, Jr., were present and their genial personalities proved particularly helpful.

Grand Rapids Branch

The regular meeting of the Grand Rapids Branch was held August 8th, at the Vocational School, with President J. Van Dyke, presiding.

The attendance was not as large as previous meetings, due to the

extreme hot weather, most of the members trying to keep cool, riding in their Rolls Royces, Buick and Caddillacs, however, those that did attend formulated plans for the coming year, that once a month some certain member of the branch, will be called on for a paper to be read and discussed at that meeting, that member to preside at the meeting during the discussions. It is hoped the members will give full cooperation to these meetings and discussions, and to the committee in charge of this programe, who are Messers. Allen Poe, Meller, Holly, Chairman Rickson.

There are clever men in this Branch, and in their particular lines, and for the members to reserve the full benefits from these meetings, the meetings should be regularly attended.

Supreme Ex President Allen gave a very splendid report of the Convention, and spoke of the earnest, and conscientious work of the Providence Branch, and manner in which the Convention was held.

The new Vocational School will soon be ready for occupancy by the Grand Rapids Branch, who will have a fully equipped plating room for their own use. Coming meeting will be held Wednesday, Sept. 12th. 8 P. M. at the Vocational School. "Let's Go Boys."

St. Louis Branch

Firts Vice President E. J. Musick, wife and daughter Ruth, also F. Terrio and wife completed their auto trip to convention, with nothing more than a puncture or two, and were delighted with the ride. With the others that attended the convenion from S. Louis, all felt the effort to go to Providence, was more than repaid, by the royal way everybody was entertained. Thanks to committees in charge.

The reports of the delegate's was so complimentary, that much enthusiasm was started for Milwaukee convention. With one exception (Chicago) we expect St. Louis to have largest delegation at Milwaukee.

On August 11th, we held our annual outing at Belleville, Ill. Messrs. Koderhandt, Weygandt and Eckhardt did their part well in the arrangements. After a swim and basket dinner, E. J. Musick took charge, and some real contests were pulled off, and prizes awarded.

It was voted the best Outing we have had. On Sept. 4th, our regular meeting was well attended and business matters quickly handled by President F. Menniges. Librarian F. Horath has promised some good meetings this season, making the Question Box a feature, along with lectures at most meetings.

Cleveland Branch

The regular business meeting was held Saturday evening, Aug. 25, with Mr. TerDoest presiding. We had a large attendance which was very encouraging to the new officers. After the regular order of business we held a very snappy general discussion on different topics in a round table fashion instead of grouping off with two or three here and there, and it was very interesting to all. We also received a new application, John J. House, 6617 Bliss Ave., and we hope to keep this good work a going. The meeting was adjourned at 10:45 P. M.

Chicago Branch

Regular monthly meeting of Chicago Branch was held August 11th, we had a large attendance in spite of a terrible rain and electric storm in the early morning, which flooded every basement in Chicago. We elected Mr. Clyde H. Wrim, to active membership and also reinstated our old friend, Jim Zeman, we are all in hope that Jim is going to be a regular at all of our meetings. The business being over, President Hanlon turned the meeting over to our ligrarian, who in turn called on E. V. Allen, J. Emmett, O. E. Servis and R. J. Hazucha for their recommendations on a modern plating room floor and strangely enough, these gentlemen each spoke of a different floor, which made the meeting very interesting, this was evident from the discussions that followed. Subject for next meeting will be "Ventilation."

The librarian had the following questions in the question box:

Question No. 1—What is the best method of plating steel with zinc and then directly with nickel and what solution should be used.

Answer No. 1—This question proved very interesting and the following suggestions were given, rapid agitation, strong current and additions of sodium citrate to the nickel solution.

Question No. 2—What is the cause and remedy of a duplex copper solution streaking.

Answer No. 2—Increase the distance between the anoden and cathode and also increase the sulphuric acid content.

Detroit Branch

Regular meeting A. E. S. held Friday Sept. 7, 1923, with a good attendance, B. F. Miller presiding.

Minutes of previous meeting read and approved.

Communications from F. J. Hanlon, Walter Fraine, Andrew V. Re, Frank Powers of Surnia, Ont. received and necessary action taken. No applications for membership and no applicants to be elected to membership.

Good of Order, E. G. Lovering, submitted a section of Camp door, with a 2-1000 deposit, claimed to be obtained in 10 minutes, with a current density of not exceeding 60 amps. Question? Can it be done in stated time. Let every branch member give his ideas. (A deposit of Nickel .002" thick would require about 41 grams per square foot of surface, which would take about 40 minutes at a current density of 60 amp. Some one is wrong and it isn't our friend, Faraday either. We would suggest a new Ammeter Clock and Micrometer or more care in their use, Editor). Lovering did not deposit this himself, it was submitted as a sample by an auto bumper concern of this city. Deposit was on a 140 grease polish and was very fine and adhesive. 2nd sample of steel electric iron top, with a spot 1"x½ on the back, which hung uppermost in solution, not heavily plated work was absolutely clean upon entering the vat, going through 3 cleaners, 2 of them electric and the back swabbed with brush to make sure, solution agitated by compressed air, and when air is

not used, there is no trouble and no sign of spot, 1½ oz. ammonium chloride was added to eliminate any chance of lack of conductivity, but when air was turned on after 15 minutes, spot again appears and appears greasy there, air line was discovered to be full of greasy water and grease, although no sign was discovered in waste, that is used as a filter, before air enters tank; no sign of oil appears upon solution at rest solution has been transferred to another tank and report will be submitted at next meeting. Question? What caused it?

Frank Shepherd of Flint was a visitor and told of difficulties in plating. Radiator shells in warm solution. Meeting was highly enjoyable, as discussions were warm and spirited, and adjourned at 10:15, until Saturday, Oct. 6, as meeting will be held once in 3 months on Saturday night, for benefit of out of town members.

Philadelphia Branch

Phila Branch regular monthly meeting was held Sept. 7th, with a good attendance. Pres. Geo. Gehling, presiding.

A communication from Supreme Officers was read, in which they extend their greetings and ask for the hearty co-operation of members in making this a banner year for the A. E. S.

Report of the delegates and the members who attended the convention was read, and listened to with much interest. All spoke of its success and the hospitality shown by our New England members.

Two applications were received and four applicants were elected to membership under good and welfare, a general discussion was held on various subjects especially the zinc plating of fuse caps. This was conducted by Mr. Scott, who is writing a paper on this subject, which will be read at our annual banquet in November. The arrangement for the banquet are in the hands of Messrs. Asimus Rathbon, Jordan, Underwood, Scott, Bell, Bayer, Ule, Gehling. And we may look for a good time.

Bridgeport Branch

Report of Bridgeport September meeting follows: One new member elected to our fast growing membership. Mr. Joseph Gilmore, 696 Kossuth St., Bridgeport, Conn. A committee has been appointed to secure speakers for the coming season and we look forward with interest to these open metings. Our president, Mr. J. W. Slottery, spoke upon the Old Methods of Firearm plating, and gave some very interesting remarks and also a sample revolver plated twenty years ago in excellent condition was shown.

Newark Branch

The regular meeting of the Newark Branch, A. E. S., held at 17 Central avenue, there being 22 members and three visitors present. The meeting was called to order by President Clark at 8:05 p. m. Minutes of the previous meeting were read and approved. Committee appointed to secure room for laboratory work of the chemistry class.

Mr. Hults of Newark Branch gave a very interesting talk on the manufacture of nickel salts, outlining the history of nickel salts and their

ores, mining, weathering, after which ore is roasted flux with heater, sulphur driven off, leached, solution put in electrolytic tank cathode copper, lead, anode current 20-25 amperes per square foot, after which solution evaporated down in lead pans and cooled, forming single salts. By the addition of ammonia double salts are formed.

This talk was very interesting and instructive throughout. Mr. Hults drew charts of the various chemical reactions and plans of furnaces used.

Waterbury Branch

The last meeting of Waterbury Branch, A. E. S., was largely attended, several members of the Bridgeport Branch being in attendance. The newly elected officers who presided are as follows: President, William J. Gray; vice-president, Burton Snagg; secretary, William F. Guilfoile; treasurer, William Detage; librarian, John Messick; sargeant-at-arms, James Leonard; executive committee, Norman Tice, Harry Johnquest and Hugh Byrnes. It was voted to appoint a committee to confer with Hartford and Bridgeport branches in relation to a banquet to be held in the near future. After the regular business was over, an hour was spent in discussing such questions as the practicability of using analuminum or a lead lining for a nickel plating tank; bright dipping on brass plate work; resilvering miters and the soldering of aluminum.

Chicago Branch

Chicago Branch met Saturday, September 8, at the Hardware Club, with President Hanlon in the chair and all the officers present.

We had a communication from the Supreme Officers asking for cooperation during this coming year, pointing out the fact that only in this way our society would prosper as it did heretofore.

In spite of the bad weather we had a large attendance and an unusually interesting meeting and we are sure none of the members regretted being with us on this particular evening. A lot of this was due to Mr. Hay's question and samples of silver plated reflectors which he exhibited at the meeting and which were full of minute black spots. After a long discussion there were a lot of suggestions made on the floor, and we are sure Mr. Hay will come back next meeting and tell us how he overcame his troubles.

The librarian had the following questions in the mystery box:

Question No. 1—How can a good cleaner be made?

Answer No. 1—The following was recommended: Add to each gallon of water 3 ozs. trisodium phosphate, 3 ozs. soda ash, 2 ozs. caustic soda and ⅛ oz. sodium silicate.

Question No. 2—What is a good formula for a nickel solution to be used for mechanical plating, the deposit must be bright?

Answer No. 2—Water, 1 gal.; double nickel salt, 8 ozs.; single nickel salt, 5 ozs.; boric acid, 2 ozs. and salamoniac, 2½ ozs. was recommended.

Question No. 3—What causes nickel to become brittle and how can it be prevented?

Answer No. 3—The cause of nickel being brittle may come from the solution being too low in metal, too acid, too much current used or insuf-

ficient anode surface. It was suggested to neutralize solution with carbonate of nickel first and then add more salts and anodes into the tank.

Question No. 4—What is a good additional agent for a hot cyanide copper solution to make it throw into deep recesses without plating too heavy on exposed parts?

Answer No. 4—This question brought out a lot of discussion, and it was recommended not to use the solution above 120 deg. F. and about 12 to 15 amperes per square foot of surface. Small addition of hyposulphide of soda is also beneficial in obtaining a uniform copper deposit.

APPLICATIONS FOR MEMBERSHIP

Philadelphia Branch

J. N. Eddowes, Active.....4901 Stenton Ave., Philadelphia, Pa.
C. W. Rau, Active .....629 State St., York, Pa.

Toronto Branch

Josephh Ellis.....938 Ossington Ave., Toronto, Canada

Cleveland Branch

John J. House .....6617 Bliss Ave., Cleveland, O.

Hortford-Connecticut Valley Branch

George M. Smith, Active .....Moodus, Conn.

Chicago Branch

E. G. Stenberg, Active .....2243 Kenneth Ave., Chicago, Ill.

ELECTED TO MEMBERSHIP

Philadelphia Branch

Williard M. Scott, Active .....2213 N. Bancroft St., Philadelphia, Pa.
Donald F. Cranor, Active.....Conshokocken, Pa.

Hartford-Connecticut Valley Branch

Dennis B. Houlihan .....324 Grove St., Chicopee Falls, Mass.

Milwaukee Branch

John N. Hock .....310 Galena St., Milwaukee, Wis.

Chicago Branch

James Zeman (reinstated), Active.....1522 N. Luna Ave., Chicago, Ill.
Clyde H. Winn, Active .....1715 S. Spring St., Springfield, Ill.

Philadelphia Branch

William M. Carrick, Active.....633 N. 12th St., Philadelphia, Pa.
E. Eisele, Active .....2045 Wilmot St., Philadelphia, Pa.
A. Marrcuso, Active .....627 Park Ave., Pensauken, N. J.
B. A. Fulmer, Active .....619 Chestnut St., Lancaster, Pa.

Bridgeport Branch

Joseph T. Gilmore, Active .....696 Kossuth St., Bridgeport, Conn.

Newark Branch

F. S. Bruen, Active .....90 North 19th St., East Orange, N. J.

Toledo Branch

Joseph Fagan .....212 W. Reynolds St., Toledo, O.
Edward F. Spies .....No. 9 Townsend St., Fort Smith, Ark.

New York Branch

George S. Shea .....1396 Greene St., Brooklyn, N. Y.

BOSTON

Regular meetings are held third Friday of each month, at 8 p. m., at the American House, Boston. Secretary, A. W. Garrett, 821 Dorchester Ave., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, David Fleming, 97 Roosevelt St., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Hardware Club of Chicago, Room 1125. Secretary, R. J. Hazucha, 5128 Warwick Ave., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday in each month, Y. M. C. A. Building. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Hotel Winton. Secretary, H. S. Kneeland, 3924 Clybourne Ave., Cleveland, Ohio.

HARTFORD-CONN. VALLEY

Meets on the fourth Monday of each month at 747 Main St., Hartford, Conn. Secretary, Tennant Elwin, Newington, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Wm. Hohman, 123 N. Webster St., Dayton, Ohio.

DETROIT

Meets first Friday of each month at the Old Colony Club, 2nd floor, Hotel Tuller. Secretary, E. W. Woodmansee, 1427 Lee Place, Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N.E. Secretary, Chas. S. Whalley, 931 Pine Ave., N.W., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Lipps Hall, 321 3d St. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Meets every Friday at 84 Craig St. West. Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at No. 17 Central Ave., Newark, N. J. at 8 p. m. Secretary, George Reuter, 30 Maple Ave., Irvington, N. J.

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, John E. Sterling, 468 Grand Ave., Long Island City, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, Robert Crook, 185 County St., Attleboro, Mass.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Hotel Seneca. Albert H. Doering, Secretary, 49 Cutler St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDA

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, W. W. Weiker, 411 3d St., Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Secretary, E. Coles, 66 August Ave., Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. F. Guilford, 230 Cooks St., Waterbury, Conn.